Amendments to the Drawings

Replacement sheets for Figs. 1-9 are enclosed which formalize the drawings which were submitted with the application. No other changes have been made.

REMARKS

The specification has been amended as required by the Examiner.

Replacement sheets which formalize the drawings currently on file are enclosed. No other changes have been made. Approval by the Examiner is respectfully requested.

Claim 80 was objected to. By this amendment claim 80 has been amended and the abbreviations have been spelled out

Claim 16 was rejected under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention. Claim 16 has been amended to correct the problems noted by the Examiner.

Claims 1, 11, 12, 14, 16, 17, 49, 50, 60, 61, and 80 were rejected under 35 USC 102(e) as being anticipated by Oh et al (US 2003/0118866).

Claim 1 has been amended to clearly specify that the first component of the host is not an amino-substituted perylene with or without a linking phenylene group between the amino-group and perylene. This language would exclude the compounds in Oh et al shown in cols. 6-14, J-1, J-2, J-5, J-6, J-7, J-8, J-18-24, J-29, J-31, J-34, J-37, J-38, J-39, J-43, J-44, J-46, J-47, J-48, J-50, J-52, J-56.

Oh et al clearly show amino-substituted perylenes. Clearly Oh et al recognized that only amino-substituted perylenes with or without a linking phenylene group between the amino-group and perylene could be advantageously used in a mixture of at least two components. Nothing in the specification would indicate that the claimed first component without amino substituents was ever suggested by Oh et al. Applicants believe that Oh et al never appreciated the subject matter now found in element (d)(i) of claim 1. Moreover, Oh et al never realized the advantages that could be obtained by using the claimed compounds. Oh et al clearly believed that their amino-substituted perylenes could only be used with a red luminescent dopant. There is no such restriction in claim 1 since Applicants have demonstrated that other dopants can be used, for example, green (see pages 125-127, Examples 22-30) and blue-green (see page 129, Example 35).

The present invention as set forth in claim 1 has numerous advantages which were never recognized by Oh et al. For example, improved operational stability, lower drive voltage, and improved color chromaticity. The

only advantage Oh et al considered for a red light emitting OLED was improved luminescence efficiency.

An amino substituent in amino-substituted perylenes defines their ionization potential. Applicants have found that without an amino substituent, the ionization potential is defined by the perylene moiety or substituted perylene moiety. It is believed that Oh et al's disclosure provides no suggestion of the present invention since the function of an amino-substituted perylene and the claimed perylenes is significantly different in an OLED device. With amino-substituted perylenes the ionization potential is low enough that the holes are easily injected from the hole transporting layer which profoundly affects position and density distribution of the charge recombination zone and luminescence zone within the light-emitting layer (LEL).

Moreover, one must carefully consider concentration-sensitive aggregation and spectroscopic properties before defining useful amino-perylenes, or any perylenes for that matter. Oh et al fail to teach how take into account these unobvious aggregation properties in order to set up the proper conditions for the electronic excitation energy cascade within the LEL and select the proper perylenes and the proper emissive dopants. Selection of proper conditions and LEL components is taught in the present invention. Therefore, Oh et al is an ineffective reference since it does not teach one skilled in the art how to make and use the claimed invention.

It is believed that amended claim 1 defines unobvious subject matter. The remaining rejected claims depend upon claim 1 and should be allowed along with it.

Claims 1, 11, 12, 14, 16, 17, 49, 50, 60, 61, and 80 were rejected under 35 USC 102(b) as being anticipated by or in the alternative under 35 USC 103(a) as obvious over Aziz et al (US 6,392,250).

Applicants believe that the Examiner has misconstrued the teachings of Aziz et al. Aziz et al disclose a mixture of hole transporting material (HTM), such as NPB, and electron transporting material (ETM), such as Alq, to form a LEL host and not a mixture of Alq and perylene. All of the HTM disclosed by Aziz et al are aromatic amines. The unsubstituted perylene mentioned by Aziz et al is used as a blue emissive dopant (col. 10, lines 63-67) and is not the perylene set forth in element (d)(i) of claim 1 which does not emit

light but instead transfers its excitation energy to the emissive dopant. Further, Aziz et al disclose the use of various dopants, one at a time, i.e., either perylene or DCJTB (col. 11, lines 21-22, 35-42, 48-51, and so on). Aziz et al do not teach having both perylene and DCJTB in the same device and in the same layer. One skilled in the art would understand Aziz et al suggest using perylene as a dopant for a blue-emissive host, consisting of, e.g. a mixture of NPB and BAlq (blue-emitting analog of Alq), to make a blue-emissive OLED, and DCJTB as a dopant for a green-emissive host, such as a mixture of NPB and Alq, to make a red-emissive OLED.

Aziz et al are silent as to the use of perylenes which can form the various states set forth in element (d)(i) of claim 1. Since perylene is an emissive dopant in Aziz et al, it is clear that it is not advantageous to have it aggregate because this would reduce the luminescence. Aziz et al therefore teach away from the present invention and they set forth a different structure.

Accordingly, it is believed there is no motivation in Aziz et al for the present invention and claim 1 is unobvious in view of Aziz et al.

Claims 1, 11, 12, 14, 16, 17, 49, 50, 60, 61, and 80 were rejected under 35 USC 103(a) as being unpatentable over Aziz et al (US 6,392,250) in view of Fujita et al (US2003/0137241).

Aziz et al has been discussed above. Fujita et al focuses on synthesis of perylenes, more specifically, mostly periflanthenes. They disclose the use of this material in an EL device (page 129, col, 1, example 4) which uses rubrene as a host and a periflanthene as a dopant and does not involve either Alq or DCJTB.. There is nothing in Fujita et al which would suggest the use of the component (d)(i) of claim 1. Applicants fail to see how Fujita et al could reasonably be combined with Aziz et al since neither of them disclose or even imply the structure of claim 1. Accordingly, even if they could be combined they would provide no suggestion of the present invention.

It is believed that these changes now make the claims clear and definite and, if there are any problems with these changes, Applicants' attorney would appreciate a telephone call.

In view of the foregoing, it is believed none of the references, taken singly or in combination, disclose the invention set forth in claim 1. The remaining claims depend upon claim 1 and should be allowed along with it. Accordingly, this application is believed to be in condition for allowance, the notice of which is respectfully requested.

Respectfully submitted,

Attorney for Applicant(s)
Registration No. 22,363

Raymond L. Owens/das
Rochester, NY 14650
Telephone: 585-477-4653
Facsimile: 585-477-4646

If the Examiner is unable to reach the Applicant(s) Attorney at the telephone number provided, the Examiner is requested to communicate with Eastman Kodak Company Patent Operations at (585) 477-4656.